IN THE CLAIMS

Claim 1 (Currently Amended): An optical sheet produced by injection molding ~~method~~, wherein stresses on surface layers of two opposing main planes is up to 200 kg/cm^2, and wherein a difference of stress on surface layers of two opposing main planes is within 20%.

Claim 2 (Cancelled).

Claim 3 (Currently Amended): An optical sheet according to claim 1, wherein the area of each of the main planes is 4000 cm^2 or more, and the thickness is 4 mm or less.

Claim 4 (New): The optical sheet according to Claim 1, wherein the injection molding includes annealing.

Claim 5 (New): The optical sheet according to Claim 4, wherein the annealing is carried out for two to four hours.

Claim 6 (New): The optical sheet according to Claim 4, wherein the annealing is carried out for two to four hours at a temperature which is from 10 to 20°C lower than a deflection temperature under load.

Claim 7 (New): The optical sheet according to Claim 1, wherein the injection molding is carried out without annealing.

Claim 8 (New): The optical sheet according to Claim 1, wherein the injection molding is carried out with a mold having a thin plate member attached to a rear surface thereof.

Claim 9 (New): The optical sheet according to Claim 8, wherein the thin plate member comprises nickel.

Claim 10 (New): The optical sheet according to Claim 8, wherein the thin plate member has a low thermal conductivity member.

Claim 11 (New): The optical sheet according to Claim 9, wherein the low thermal conductivity member is a polyimide film.

Claim 12 (New): The method of Claim 8, wherein the mold has a Fresnel lens side and a prism surface side.

Claim 13 (New): The optical sheet of Claim 11, wherein the temperature of the prism surface side and Fresnel lens side are the same during the injection molding.

Claim 14 (New): The optical sheet of Claim 8, wherein the thin plate member has a thickness of 0.5mm.

Claim 15 (New): The optical sheet of Claim 8, wherein the polyimide film has a thickness of from 0.1 to 0.3mm.

Claim 16 (New): The optical sheet of Claim 1, wherein the injection molding comprises

changing the volume of a mold during injecting or after completion of filling.

Claim 17 (New): The optical sheet of Claim 13, wherein the Fresnel lens side has a pattern of from 10 to 80 μm in height.

Claim 18 (New): The optical sheet according to Claim 1, wherein the injection molding includes heating a resin to 270°C.

Claim 19 (New): The optical sheet according to Claim 1, wherein the injection molding is injection compression molding, the thickness of the sheet is 4 mm or less and is 4,000 cm^2 or greater.

BASIS FOR THE AMENDMENT

Claims 1 and 3-19 are active in the present application. Claim 2 has been canceled. Claim 1 has been amended to include the limitations of Claim 2. Claims 4-19 are new claims. Support for new Claim 4 is found on page 5, line 20. Support for new Claim 5 is found on page 5, line 21. Support for new Claim 6 is found on page 5, line 22. Support for new Claim 7 is found on page 6, lines 3 and 4 from the bottom. Support for new Claim 8 is found on page 6, lines 4. Support for new Claim 9 is found on page 6, line 5. Support for new Claim 10, is found on page 10, line 6. Support for new Claims 11-13 is found in Table 4. Support for new Claims 14 and 15 is found in Table 1. Support for new Claim 16 is found on page 6, lines 15-18. Support for new Claim 17 is found on page 9, line 7. Support for new Claim 18 is found in Table 1. Support for new Claim 19 is found on page 5, lines 15; page 4, lines 2-4. No new matter is believed to have been added by this amendment.

REQUEST FOR RECONSIDERATION

Applicants thank Examiner Blackwell-Rudasil for the helpful and courteous discussion of June 11, 2003. During the discussion, Applicants' U.S. representative pointed out that none of the prior art references relied upon by the Examiner disclose that maintaining the stress differential between main planes of an optical sheet within 20% may yield sheets of lower deformation.

Applicants have discovered that an optical sheet produced by injection molding has less deformation when the stress difference between the prism side surface and Fresnel lens side surface of the optical sheet is less than 20%. Table 5 on page 17 of the specification provides a number of Examples showing the results of a number of molding runs wherein the stresses of the prism and Fresnel lens sides of an optical sheet are provided. In Examples 11-

13 the difference in the stresses of the prism surface side and Fresnel lens side surfaces of the optical sheet are greater than 20% (Table 5 is reproduced below in part). It is readily apparent from the last column of the Table that the deformation of Examples 11-13 after the test, wherein the difference in the stresses between the prism surface side and the Fresnel lens sides is greater than 20%, are substantially greater than (on the order of 10 ×) the deformation in millimeter in comparison to Examples 6-10 which meet the claim limitations.

Table 5

	Metal mold No.	Stress on surface layer (kg/cm^2)			Pattern transfer rate	Deformation before test (mm)	Deformation after test (mm)
		Measuring position	Stress (prism surface side)	Stress (Fresnel lens side)			
Example 6	1	A	127	138	0.93	0.02	0.25
		B	136	125	0.99	0.03	0.27
		C	108	98	0.93	0.01	0.13
		D	102	105	0.92	0.03	0.15
		E	123	118	0.93		
Example 7	2	A	175	180	0.92	0.03	0.34
		B	150	145	0.90	0.03	0.32
		C	122	113	0.92	0.04	0.27
		D	133	124	0.93	0.06	0.15
		E	127	120	0.96		
Example 8	3	A	185	160	0.93	0.04	0.36
		B	170	155	0.94	0.03	0.25
		C	152	134	0.98	0.03	0.20
		D	140	137	0.95	0.02	0.23
		E	185	163	0.95		
Example 9	4	A	163	180	0.90	0.04	0.41
		B	176	155	0.92	0.05	0.23
		C	142	126	0.94	0.07	.045
		D	153	175	0.93	0.07	0.25
		E	132	138	0.92		
Example 10	5	A	145	166	0.91	0.04	0.16
		B	175	155	0.92	0.07	0.35
		C	148	133	0.95	0.05	0.37
		D	132	143	0.95	0.08	0.51
		E	180	165	0.94		
Example 11	1	A	120	162	0.93	0.01	2.21
		B	125	163	0.93	0.03	2.12
		C	110	146	0.94	0.03	1.87
		D	100	146	0.95	0.04	2.60
		E	124	138	0.90		
Example 12	2	A	185	145	0.92	0.33	3.45
		B	170	133	0.92	0.25	3.23
		C	150	111	0.94	0.28	2.48
		D	147	100	0.95	0.23	2.51
		E	146	110	0.96		
Example 13	3	A	195	152	0.94	0.35	3.75
		B	174	133	0.95	0.33	4.16
		C	140	105	0.96	0.41	3.48
		D	155	110	0.96	0.32	3.51
		E	148	113	0.90		

Boxed rows indicate comparative examples where the difference of the stress between layers is greater than 20%.

In none of the prior art references cited by the Examiner is it disclosed or suggested that optical sheets having stresses between the prism surface side and the Fresnel lens side of

an optical sheet lower than 20% provide an improved optical sheet exhibiting, *inter alia*, lower deformation.

Claim 1 has been amended to incorporate the limitations of prior Claim 2. The amendment to Claim 1 overcomes the rejections under 35 U.S.C. § 102(b) in view of Japanese Patent Application Publication No. 04-0674444 and European Patent Application Publication No. 0450612 A2.

The Office further rejected the claims under 35 U.S.C. § 103(a) in view of a patent to Warino (U.S. 6,171,527). The Warino patent is the corresponding U.S. patent of JP-A-11-36924 mentioned on page 6 of the present specification.

Applicants note that the Warino patent nowhere discloses or suggests that the difference in stresses between the prism surface side and Fresnel lens side of an optical sheet should be maintained below 20% in order to achieve improved optical sheet performance.

The Office states on page 3, last paragraph of the Office Action "because the process parameters are substantially the same, absent a showing to the contrary that the article as claimed could not be manufactured according to the process set forth by Warino et al., the surface stresses claimed would inherently be present in the prior art." The metal mold used in the injection molding of the present invention is shown in Figure 7 of the drawings. It is immediately evident from Fig. 7(a) that both the front and back elements of the metal mold have a thin plate member (shown as numeral 5 in both Figs. 7(a) and (b)). This may be compared, for example, with the mold structures of the Warino patent. As can be seen in Figures 4, 6 and 7 of Warino, the front surface of metal mold of Warino has an architecture of elements including (1) cooling water (2) mold (3) member having low thermal conductivity (4) thin plate body which contacts the resin. The back surface of the mold is disclosed to be a "medium of a plate thickness".

A mold of the Warino structure must necessarily provide a temperature gradient between the surfaces of the molded article since one side of the mold is close to the cooling water and has a thin plate member having a heat capacity different from the other mold surface.

Applicants have demonstrated that when the temperature of the prism surface side and Fresnel lens side surface of a mold is different, the difference in the stress of the layers is greater than 20%. As is demonstrated in Table 4 (reproduced below for convenience), each of Examples 11, 12 and 13 have different mold temperatures for the prism and the Fresnel lens surface sides. It is these Examples which provide optical sheets having differences in stresses in the surface layers of greater than 20% (per Table 5 above) and consequently provide inferior deformation characteristics.

Table 4

	Molding machine	Metal mold temperature (°C)		Metal mold (Thin plate member (thickness in mm)/low thermal conductivity member (thickness in mm))	Annealing
		Prism surface side	Fresnel lens side		
Example 6	SG -150	80	80	Nickel (0.5)/None	80°C for 3 hours
Example 7	MDIP-1400	80	80	Nickel (0.5)/polyimide (0.1)	None
Example 8	MDIP-1400	80	80	Nickel (0.5)/polyimide (0.2)	None
Example 9	MDIP-1400	80	80	Nickel (0.5)/polyimide (0.3)	None
Example 10	MDIP-1400	80	80	Nickel (0.5)/polyimide (0.3)	None
Example 11	SG-150	80	70	Nickel (0.5)/None	80°C for 2 hours
Example 12	MDIP-1400	60	80	Nickel (0.5)/polyimide (0.1)	None
Example 13	MDIP-1400	60	80	Nickel (0.5)/polyimide (0.2)	None

Boxed rows are comparative examples having stress differences of greater than 20% between layers.

Applicants have therefore demonstrated that the prior art optical sheet, produced by a method using a mold which has an unsymmetrical front surface/back surface architecture and consequently different front/back surface temperatures, yields optical sheets of poor deformation characteristics. The optical sheets of Warino cannot therefore inherently have stress differences between layers that are within 20% as presently claimed.

Applicants have therefore shown that the presently claimed method, wherein the difference in stresses between the lens surface side and the Fresnel lens surface side of an optical sheet is less than 20% is not obvious in view of the prior art (Warino) optical sheet wherein the metal mold has an asymmetrical front to back architecture.

New dependent Claim 19 has been added. The new claims limits the main planes of the optical sheet to panes that are greater than 4,000 cm^2 in area and have a thickness of 4mm or less. Warino does not disclose injection compression molding to form an optical sheet that is 4,000 cm^2 in area and has a thickness of 4 mm or less. Applicants submit that new dependent Claim 19 is further patentable over the prior art of record as evidenced by Warino's silence in regards to the formation by injection compression molding of an optical sheet of large area and low thickness.

Applicants note that Japanese Patent Application Publication No. 2000-321441, cited in the rejection of the present claims under 35 U.S.C. § 102(b), does not qualify as prior art. This Japanese Patent Application has an effective date of November 24, 2000. The present application is a §371 application of the International Application PCT/JP00/3800 filed on June 12, 2000. The effective U.S. filing date of a PCT application is the filing date of PCT application (see 35 U.S.C. § 363 and M.P.E.P. § 1893). A publication with a publication date of November 24, 2000 does not qualify as prior art in view of the present effective U.S. filing date of June 12, 2000. Applicants respectfully request the withdrawal of the rejection in view of JP 2000-321441.

Applicants submit the amendment to the claims overcomes the rejections. Applicants respectfully request the withdrawal of the rejections and the passage of all now pending claims to Issue.

Respectfully Submitted,

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